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U S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

3286-0171B

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

09/936047

TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/DE00/00737	March 9, 2000	March 9, 1999
<b>TITLE OF INVENTION</b> AUTOMATION SYSTEM WITH AUTOMATION OBJECTS WITH A DIRECTORY STRUCTURE AND METHOD FOR THE MANAGEMENT OF AUTOMATION OBJECTS IN A DIRECTORY STRUCTURE		
<b>APPLICANT(S) FOR DO/EO/US</b> BECKER, Norbert; DIEZEL, Matthias; ECKARDT, Dieter; KRAMER, Manfred; LEINS, Ralf; MOELLER-NEHRING, Walter; SCHNEIDER, Karsten; WINDL, Helmut, *		

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

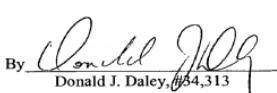
- This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
- This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
- This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39 (1).
- The US has been elected by the expiration of 19 months from the priority date (Article 31).
- A copy of the International Application as filed (35 U.S.C. 371(c)(2))
  - is transmitted herewith (required only if not transmitted by the International Bureau). WO 00/54147
  - has been transmitted by the International Bureau.
  - is not required, as the application was filed in the United States Receiving Office (RO/US).
- An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
  - is transmitted herewith.
  - has been previously submitted under 35 U.S.C. 154(d)(4)
- Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
  - are transmitted herewith (required only if not transmitted by the International Bureau).
  - have been transmitted by the International Bureau.
  - have not been made; however, the time limit for making such amendments has NOT expired.
  - have not been made and will not be made.
- An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
- An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
- An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

**Items 11. to 20. below concern document(s) or information included:**

- An Information Disclosure Statement under 37 CFR 1.97 and 1.98-1449 and International Search Report (PCT/ISA/210) w/ 3 documents
- An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
- A **FIRST** preliminary amendment.
- A **SECOND** or **SUBSEQUENT** preliminary amendment.
- A substitute specification.
- A change of power of attorney and/or address letter.
- A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821-1.825.
- A second copy of the published international application under 35 U.S.C. 154(d)(4).
- A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
- Other items or information:
  - 1.) PCT Substitute Claims Letter w/ amendments
  - 2.) Two (2) sheets of Formal Drawings

\*BIEHLER, Georg; DONNER, Albrecht; HERBERTH, Harald, LANGKAFEL, Dirk; LANGE, Ronald; SCHMOLL, Juergen; WELZ, Ulrich

JC12 Rec'd PCT/PTO 07 SEP 2001

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEYS DOCKET NUMBER																
<b>09/936047</b>	PCT/DE00/00737	3286-0171P																
		<b>CALCULATIONS</b> <b>PTO USE ONLY</b>																
<p>21. <input checked="" type="checkbox"/> The following fees are submitted:</p> <p><b>BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5):</b>      Neither international preliminary examination fee (37 CFR 1.482)      nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO      and International Search Report not prepared by the EPO or JPO. .... <b>\$1,000.00</b></p> <p>International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO ..... <b>\$860.00</b></p> <p>International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO. .... <b>\$710.00</b></p> <p>International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... <b>\$690.00</b></p> <p>International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) ..... <b>\$100.00</b></p>																		
<b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b>																		
<p>Surcharge of <b>\$130.00</b> for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>CLAIMS</th> <th>NUMBER FILED</th> <th>NUMBER EXTRA</th> <th>RATE</th> </tr> </thead> <tbody> <tr> <td>Total Claims</td> <td>8 - 20 =</td> <td>0</td> <td>X \$18.00</td> </tr> <tr> <td>Independent Claims</td> <td>1 - 3 =</td> <td>0</td> <td>X \$80.00</td> </tr> <tr> <td>MULTIPLE DEPENDENT CLAIM(S) (if applicable)</td> <td>None</td> <td>+ \$270.00</td> <td>\$ 0</td> </tr> </tbody> </table>			CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	Total Claims	8 - 20 =	0	X \$18.00	Independent Claims	1 - 3 =	0	X \$80.00	MULTIPLE DEPENDENT CLAIM(S) (if applicable)	None	+ \$270.00	\$ 0
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<b>TOTAL OF ABOVE CALCULATIONS =</b> <b>\$ 990.00</b>																		
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.																		
<b>SUBTOTAL =</b> <b>\$ 990.00</b>																		
Processing fee of <b>\$130.00</b> for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).																		
<b>TOTAL NATIONAL FEE =</b> <b>\$ 990.00</b>																		
Fee for recording the enclosed assignment (37 CFR 1.21(b)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). <b>\$40.00</b> per property + <b>\$ 0</b>																		
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<p>a. <input checked="" type="checkbox"/> A check in the amount of <b>\$ 990.00</b> to cover the above fees is enclosed.</p> <p>b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of <b>\$ _____</b> to cover the above fees.      A duplicate copy of this sheet is enclosed.</p> <p>c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>02-2448</u>.</p>																		
<b>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.</b>																		
Send all correspondence to: <b>Birch, Stewart, Kolach &amp; Birch, LLP or Customer No. 2292</b> <b>P.O. Box 747</b> <b>Falls Church, VA 22040-0747</b> <b>(703)205-8000</b>																		
<b>Date: September 7, 2001</b> _____  By <u>Donald J. Daley</u> , #34,313																		

09936047-021702  
09/936047  
JC12 Rec'd PCT/PTO 07 SEP 2001  
PATENT  
3286-0171P

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicants: BECKER, Norbert et al.

Application No.: NEW

Filed: September 7, 2001

For: AUTOMATION SYSTEM WITH AUTOMATION OBJECTS WITH A DIRECTORY STRUCTURE AND METHOD FOR THE MANAGEMENT OF AUTOMATION OBJECTS IN A DIRECTORY STRUCTURE

**PRELIMINARY AMENDMENT**

Assistant Commissioner for Patents  
Washington, DC 20231

September 7, 2001

Sir:

The following preliminary amendments and remarks are respectfully submitted in connection with the above-identified application.

**IN THE ABSTRACT**

Please replace the Abstract with the attached revised Abstract.

**IN THE SPECIFICATION**

Please replace the original specification with the Substitute Specification attached hereto.

New U.S. Application  
Docket No.: 3286-0171P

**IN THE CLAIMS**

Please replace the original claims with the following new claims:

1. (Amended) An automation system comprising:

at least one automation object;

a directory for storing object names of the at least one automation object;

an object name assigned to a directory entry which includes first information data as a reference to the at least one automation object, second information date as a description of technological functionality and third information data as a description of interfaces of the at least one automation object, wherein once entry into the directory has taken place, the at least one automation object can be viewed by at least one of other users and tools and wherein the object name of the at least one automation object can be used to request a reference to the at least one automation object and wherein the at least one automation object can be worked on by a number of users in parallel.

2. (Amended) The automation system as claimed in claim 1, wherein the directory entry includes fourth information data for listing the names of subcomponents of the at least one automation object.

3. (Amended) The automation system as claimed in claim 1, wherein the automation system includes means for the automatic entry of an automation object into the directory.

New U.S. Application  
Docket No.: 3286-0171P

4. (Amended) The automation system as claimed in claim 1, wherein the automation system includes means for indicating that an automation object is no longer available and that a copy of the object is being created.

**Please add the following new claims:**

-- 5. The automation system as claimed in claim 2, wherein the automation system includes means for the automatic entry of an automation object into the directory.

6. The automation system as claimed in claim 2, wherein the automation system includes means for indicating that an automation object is no longer available and that a copy of the object is being created.

7. The automation system as claimed in claim 3, wherein the automation system includes means for indicating that an automation object is no longer available and that a copy of the object is being created.

8. The automation system as claimed in claim 5, wherein the automation system includes means for indicating that an automation object is no longer available and that a copy of the object is being created. --

**REMARKS**

Claims 1-8 are now present in this application, with new claims 5-8 being added by the present Preliminary Amendment. It should be noted that the amendments to original claims 1-4 of the present application are non-narrowing amendments, made solely to place the claims in proper form for U.S. practice and not to overcome any prior art or for any other statutory

New U.S. Application  
Docket No.: 3286-0171P

considerations. For example, amendments have been made to broaden the claims; to remove reference numerals in the claims; remove the European phrase "characterized in that"; remove multiple dependencies in the claims; and to place claims in a more recognizable U.S. form, including the use of the transitional phrase "comprising" as well as the phrase "wherein". Other such non-narrowing amendments include adding the phrase --at least one of-- for consistency, and placing apparatus claims (elements set forth in separate paragraphs) in a more recognizable U.S. form. Again, all amendments are non-narrowing and have been made solely to place the claims in proper form for U.S. practice and not to overcome any prior art or for any other statutory considerations.

**SUBSTITUTE SPECIFICATION**

In accordance with 37 C.F.R. §1.125, a substitute specification has been included in lieu of substitute paragraphs in connection with the present Preliminary Amendment. The substitute specification is submitted in clean form, attached hereto, and is accompanied by a marked-up version showing the changes made to the original specification. The changes have been made in an effort to place the specification in better form for U.S. practice. No new matter has been added by these changes to the specification. Further, the substitute specification includes paragraph numbers to facilitate amendment practice as requested by the U.S. Patent and Trademark Office.

New U.S. Application  
Docket No.: 3286-0171P

**CONCLUSION**

Accordingly, in view of the above amendments and remarks, an early indication of the allowability of each of claims 1-8 in connection with the present application is earnestly solicited.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Donald J. Daley at the telephone number of the undersigned below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By: Donald J. Daley  
Donald J. Daley, Reg. No. 34,373

P.O. Box 747  
Falls Church, VA 22040-0747  
(703) 205-8000

DJD:kna

New U.S. Application  
Docket No.: 3286-0171P

ABSTRACT

An automation system includes at least one automation object, with a directory for storing object names of the at least one automation object. An object name is assigned a directory entry which includes first information data as a reference to the automation object; second information data as a description of technological functionality; and third information data as a description of interfaces of the automation object. This results in immediate and permanent access to currently created (partial) solutions, so that parallel and/or distributed working on automation objects is possible.

09/936047

JC12 Rec'd PCT/PTO 07 SEP 2001

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1999P03132 WO  
PCT/DE00/00737

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DESCPAMD

MARSHALLED VERSION OF SPECIFICATION

Description

Automation system with automation objects with a directory structure and method for the management of automation objects in a directory structure

FIELD OF THIS INVENTION  
The invention relates to an automation system which has at least one automation object.

BACKGROUND OF THE INVENTION  
An automation system of this type is used in particular in the area of automation technology. An automation system of this type generally comprises a multiplicity of individual automation objects, which are frequently highly dependent on the automation object of the engineering system respectively used. This has the consequence that automation objects of one manufacturer often require their own engineering system and cannot be used in other systems with automation objects of other manufacturers.

Robert Orfali et al: "The Essential Distributed Objects Survival Guide", 1996, John Wiley & Sons Inc., New York, USA, XP002152444, discloses the standardized middleware CORBA, which allows location-, platform- and implementation-independent communication between applications. The CORBA Version 2.0 makes it possible for messages be exchanged between Object Request Brokers (ORB) of various manufacturers and in particular also over the Internet. An ORB makes it possible for a client to send a message transparently to a server object, the server object being able to run on the same machine or another machine. The ORB is responsible for finding the server object, calling up the function there, transferring the parameters and returning the result to the client.

04-25-2001  
1999P03132 WO  
PCT/DE00/00737

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DESCPAMD

*Summary of Invention*)

- 1a -

The invention is based on the object of specifying an automation system which makes it possible for automation solutions to be created on a parallel and/or distributed basis.

~~This and/or other objects are~~  
~~This object is~~ achieved by an automation system with the features specified in claim 1.

The invention is based on the realization that in previous solutions, the data of the automation solution ~~were~~ generally stored in a central data store such as a database

GR 99 P 3132

- 2 -

system. The data storage system then ~~controls~~<sup>Controls</sup> the access of various users to the data. In this case, it <sup>is</sup> ensured that each user only ~~sees~~<sup>knows</sup> consistent data and ~~is~~<sup>was</sup> isolated from changes made by other users. This generally ~~takes~~<sup>took</sup> place by a user being granted exclusive access to his required data. In this time, these data ~~were~~<sup>had</sup> not available to other users for working on them. Therefore, this solution has the following disadvantages:

- 10 • **No parallel working:** users ~~can~~<sup>can't</sup> only work on the same data records one after the other.
- **Slow exchange of partial results:** results only ~~become~~<sup>became</sup> usable for other users when the data ~~have~~<sup>had</sup> been released again by the last person working on them.
- 15 • **No joint working:** a number of users ~~cannot~~<sup>could not</sup> work on the same objects together and exchange interim results.

20 The solution according to the invention permits immediate and permanent access to currently created partial solutions by the special way in which the directory is structured as a directory service. The directory service provides all developers with access to the current partial solutions and automation objects. This results in the following advantages:

- **Parallel working:** users can work on the same data records, required for different tasks (for example interconnection and parameterization), on a parallel basis.
- 30 • **Immediate availability of partial results:** results become usable for other users more quickly, not only when the data are released again by the last person working on them.
- **Joint working:** a number of users can work on the same objects together and exchange interim results.
- 35 • **Distributed working:** users can work on a (spatially) distributed basis; by means of the directory, they can, if need be, always re-synchronize the stages

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GR 99 P 3132

- 2a -

they have reached in working.

GR 99 P 3132

*BRIEF DESCRIPTION OF THE DRAWINGS<sup>3</sup> -*

The invention is described in more detail and explained below on the basis of the exemplary embodiments represented in the figures, in which:

- 5 figure 1 shows a basic representation of how a directory is structured and its entries and  
figure 2 shows a schematic representation of the use  
of the directory entries.

*DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENTS*

- 10 Figure 1 shows a basic representation of how a directory is structured and its entries. The automation system has a directory V, in which object names O1..On of automation objects can be stored. Each object name O1..On is assigned a directory entry, which contains  
15 first information data O11 for an object reference, second information data O12 as a list of the modules contained in the automation object, third information data (O13) for the identification of interface data and fourth information data (O14) with names of  
20 subcomponents.

- With the aid of the directory structure shown in figure 1, references to created (partial) solutions and/or automation objects are stored with descriptive data.  
25 As in a telephone book, the name of the object can be used to find its reference (i.e. its telephone number).

- Along with a reference to the actual object, the entry  
30 <sup>includes</sup> comprises a description of its technological functionality through the list of names of the modules contained, a listing of the names of any subcomponents and a description of its interface, which makes it possible for other objects/tools to use the objects referenced in this way.

GR 99 P 3132

- 4 -

Figure 2 illustrates a schematic representation of the use of the directory entries. After the creation of an object, it is entered at certain points in time in the directory as entry OE1 for a first automation object. It can then be viewed by other users/tools. They can then use the name to request a reference to the object and work on or copy the latter directly.

Entering or changing or removing an object entry in the directory does not have to take place instantaneously. Here, too, the analogy with a telephone book again applies: even if individual entries become invalid, as a whole it can still be used. This property is important in particular in the case of distributed working, since the communication expenditure is minimized in this way. If an object is still in the directory, but no longer available, this is indicated when it is attempted to request a copy.

To sum up, the invention consequently relates to an automation system which has at least one automation object 1, with a directory V for storing object names O1..On of the automation objects, an object name O1..On being assigned a directory entry Oe1..Oen which has first information data O11 as a reference to the automation object, second information data O12 as a description of the technological functionality and third information data O13 as a description of interfaces of the automation object. This results in immediate and permanent access to currently created (partial) solutions, so that parallel and/or distributed working on automation objects is possible.

VARIATIONS  
91

09/1936047

MAILED-UP CLAIMS

JC12 Rec'd PCT/PTO 07 SEP 2001

04-25-2001  
1999P03132 WO  
PCT/DE00/00737

PCT/DE00/00737

CLMSPAMD

- 5 -

## Patent claims

- (An end)
1. An automation system [which has] at least one automation object, with a directory [(V)] for storing object names [(01..On)] of the automation objects, an object name [(01..On)] being assigned a directory entry [(0E1..0en)] which [has] first information data [(011)] as a reference to the automation object, second information data [(012)] as a description of the technological functionality and third information data [(013)] as a description of interfaces of the automation object, [it being possible,] once entry into the directory [(V)] has taken place, [for] the automation object [to be viewed by] other users and/or tools and [it being possible to use] the object name [(01..On)] of the automation object [to request] a reference to the automation object and the automation object [to be worked on by a number of users in parallel.]

(An end)

  2. The automation system as claimed in claim 1, characterized in that the directory entry [(0E1)] has fourth information data [(014)] for listing the names of subcomponents of the automation object.

(An end)

  3. The automation system as claimed in either of claims 1 and 2, characterized in that the automation system [has] means for the automatic entry of an automation object into the directory [(V)].

(An end)

  4. The automation system as claimed in (one of claims) 1 [to 3], characterized in that the automation system [has] means which indicates that an automation object is no longer available and that a copy of the object is being created.

NED

Printed:04-30-2001 AMENDED SHEET

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- 5. Same as 3, but dep on 2
- 6. Same as 4, but dep on 2
- 7. Same as 4, but dep on 3
- 8. Same as 4, but dep on 4

GR 99 P 3132

MARSH-UP ABSTRACT

## Abstract

Automation system with automation objects with a directory structure and method for the management of automation objects in a directory structure

The invention relates to an automation system which has at least one automation object  $\{O_1\}$ , with a directory  $\{D\}$  for storing object names  $\{O_1..O_n\}$  of the automation objects, an object name  $\{O_1..O_n\}$  being assigned a directory entry  $\{O_{11}..O_{1n}\}$  which includes first information data  $\{O_{11}\}$  as a reference to the automation object; second information data  $\{O_{12}\}$  as a description of the technological functionality; and third information data  $\{O_{13}\}$  as a description of interfaces of the automation object. This results in immediate and permanent access to currently created (partial) solutions, so that parallel and/or distributed working on automation objects is possible.

Figure 1-

## **SUBSTITUTE SPECIFICATION**

### AUTOMATION SYSTEM WITH AUTOMATION OBJECTS WITH A DIRECTORY STRUCTURE AND METHOD FOR THE MANAGEMENT OF AUTOMATION OBJECTS IN A DIRECTORY STRUCTURE

**[0001]** This application is the national phase under 35 U.S.C. § 371 of PCT International Application No. PCT/DE00/00737 which has an International filing date of March 9, 2000, which designated the United States of America, the entire contents of which are hereby incorporated by reference.

#### Field of the Invention

**[0002]** The invention relates to an automation system which has at least one automation object.

#### Background of the Invention

**[0003]** An automation system of this type is used in particular in the area of automation technology. An automation system of this type generally includes a multiplicity of individual automation objects, which are frequently highly dependent on the automation object of the engineering system respectively used. This has the consequence that automation objects of one manufacturer often require their own engineering system and cannot be used in other systems with automation objects of other manufacturers.

**[0004]** Robert Orfali et al: "The Essential Distributed Objects Survival Guide", 1996, John Wiley & Sons Inc., New York, USA, XP002152444, discloses the standardized middleware CORBA, which allows location-, platform- and implementation-independent communication between applications. The CORBA Version 2.0 makes it possible for messages be exchanged between Object Request Brokers (ORB) of various manufacturers and in particular also over the Internet. An ORB makes it possible for a client to send a message transparently to a server object, the server object being able to run on the same machine or another machine. The ORB is responsible for finding the server object, calling up the function there, transferring the parameters and returning the result to the client.

#### SUMMARY OF THE INVENTION

**[0005]** The invention is based on the object of specifying an automation system which makes it possible for automation solutions to be created on a parallel and/or distributed basis.

[0006] This and/or other objects are achieved by an automation system with the features specified in claim 1.

[0007] The invention is based on the realization that in previous solutions, the data of the automation solution were generally stored in a central data store such as a database system. The data storage system then controlled the access of various users to the data. In this case, it was ensured that each user only saw consistent data and is isolated from changes made by other users. This generally took place by a user being granted exclusive access to his required data. In this time, these data were not available to other users for working on them. Therefore, this solution had the following disadvantages:

- **No parallel working:** users could only work on the same data records one after the other.
- **Slow exchange of partial results:** results only became usable for other users when the data had been released again by the last person working on them.
- **No joint working:** a number of users could not work on the same objects together and exchange interim results.

[0008] The solution according to the invention permits immediate and permanent access to currently created partial solutions by the special way in which the directory is structured as a directory service. The directory service provides all developers with access to the current partial solutions and automation objects. This results in the following advantages:

- **Parallel working:** users can work on the same data records, required for different tasks (for example interconnection and parameterization), on a parallel basis.
- **Immediate availability of partial results:** results become usable for other users more quickly, not only when the data are released again by the last person working on them.
- **Joint working:** a number of users can work on the same objects together and exchange interim results.
- **Distributed working:** users can work on a (spatially) distributed basis; by means of the directory, they can, if need be, always re-synchronize the stages they have reached in working.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The invention is described in more detail and explained below on the basis of the exemplary embodiments represented in the figures, in which:

Figure 1 shows a basic representation of how a directory is structured and its entries and

Figure 2 shows a schematic representation of the use of the directory entries.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0010] Figure 1 shows a basic representation of how a directory is structured and its entries. The automation system has a directory V, in which object names O1..On of automation objects can be stored. Each object name O1..On is assigned a directory entry, which contains first information data O11 for an object reference, second information data O12 as a list of the modules contained in the automation object, third information data (O13) for the identification of interface data and fourth information data (O14) with names of subcomponents.

[0011] With the aid of the directory structure shown in figure 1, references to created (partial) solutions and/or automation objects are stored with descriptive data. As in a telephone book, the name of the object can be used to find its reference (i.e. its telephone number).

[0012] Along with a reference to the actual object, the entry includes a description of its technological functionality through the list of names of the modules contained, a listing of the names of any subcomponents and a description of its interface, which makes it possible for other objects/tools to use the objects referenced in this way.

[0013] Figure 2 illustrates a schematic representation of the use of the directory entries. After the creation of an object, it is entered at certain points in time in the directory as entry Oe1 for a first automation object. It can then be viewed by other users/tools. They can then use the name to request a reference to the object and work on or copy the latter directly.

[0014] Entering or changing or removing an object entry in the directory does not have to take place instantaneously. Here, too, the analogy with a telephone book again applies: even if individual entries become invalid, as a whole it can still be used. This property is important in particular in the case of distributed working, since the communication expenditure is minimized in this way. If an object is still in the directory, but no longer available, this is indicated when it is attempted to request a copy.

[0015] To sum up, the invention consequently relates to an automation system which has at least one automation object 1, with a directory V for storing object names O1..On of the automation objects, an object name O1..On being assigned a directory entry Oe1..Oen which has first information data O11 as a reference to the automation object, second information data O12 as a description of the technological functionality and third information data O13 as a description of interfaces of the automation object. This results in immediate and permanent access to currently created (partial) solutions, so that parallel and/or distributed working on automation objects is possible.

New U.S. Application  
Docket No. 3286-0171P

[0016] The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

09/936047

04-25-2001  
1999P03132 WO  
PCT/DE00/00737

PCT/DE00/00737

DESCPAMD

JC12 Rec'd PCT/PTO 07 SEP 2001

## Description

Automation system with automation objects with a directory structure and method for the management of automation objects in a directory structure

The invention relates to an automation system which has at least one automation object.

An automation system of this type is used in particular in the area of automation technology. An automation system of this type generally comprises a multiplicity of individual automation objects, which are frequently highly dependent on the automation object of the engineering system respectively used. This has the consequence that automation objects of one manufacturer often require their own engineering system and cannot be used in other systems with automation objects of other manufacturers.

Robert Orfali et al: "The Essential Distributed Objects Survival Guide", 1996, John Wiley & Sons Inc., New York, USA, XP002152444, discloses the standardized middleware CORBA, which allows location-, platform- and implementation-independent communication between applications. The CORBA Version 2.0 makes it possible for messages be exchanged between Object Request Brokers (ORB) of various manufacturers and in particular also over the Internet. An ORB makes it possible for a client to send a message transparently to a server object, the server object being able to run on the same machine or another machine. The ORB is responsible for finding the server object, calling up the function there, transferring the parameters and returning the result to the client.

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PCT/DE00/00737

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The invention is based on the object of specifying an automation system which makes it possible for automation solutions to be created on a parallel and/or distributed basis.

This object is achieved by an automation system with the features specified in claim 1.

The invention is based on the realization that in previous solutions the data of the automation solution are generally stored in a central data store such as a database

GR 99 P 3132

- 2 -

system. The data storage system then controls the access of various users to the data. In this case, it is ensured that each user only sees consistent data and is isolated from changes made by other users. This generally takes place by a user being granted exclusive access to his required data. In this time, these data are not available to other users for working on them. Therefore, this solution has the following disadvantages:

- 10     • **No parallel working:** users can only work on the same data records one after the other.
- **Slow exchange of partial results:** results only become usable for other users when the data have been released again by the last person working on them.
- 15     • **No joint working:** a number of users cannot work on the same objects together and exchange interim results.

20     The solution according to the invention permits immediate and permanent access to currently created partial solutions by the special way in which the directory is structured as a directory service. The directory service provides all developers with access to the current partial solutions and automation objects. This results in the following advantages:

- 25     • **Parallel working:** users can work on the same data records, required for different tasks (for example interconnection and parameterization), on a parallel basis.
- 30     • **Immediate availability of partial results:** results become usable for other users more quickly, not only when the data are released again by the last person working on them.
- **Joint working:** a number of users can work on the same objects together and exchange interim results.
- 35     • **Distributed working:** users can work on a (spatially) distributed basis; by means of the directory, they can, if need be, always re-synchronize the stages

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GR 99 P 3132

- 2a -

they have reached in working.

GR 99 P 3132

- 3 -

The invention is described in more detail and explained below on the basis of the exemplary embodiments represented in the figures, in which:

5 figure 1 shows a basic representation of how a directory is structured and its entries and figure 2 shows a schematic representation of the use of the directory entries.

10 Figure 1 shows a basic representation of how a directory is structured and its entries. The automation system has a directory V, in which object names O1..On of automation objects can be stored. Each object name O1..On is assigned a directory entry, which contains  
15 first information data O11 for an object reference, second information data O12 as a list of the modules contained in the automation object, third information data (O13) for the identification of interface data and fourth information data (O14) with names of  
20 subcomponents.

With the aid of the directory structure shown in figure 1, references to created (partial) solutions and/or automation objects are stored with descriptive data.  
25 As in a telephone book, the name of the object can be used to find its reference (i.e. its telephone number).

Along with a reference to the actual object, the entry comprises a description of its technological functionality through the list of names of the modules contained, a listing of the names of any subcomponents and a description of its interface, which makes it possible for other objects/tools to use the objects referenced in this way.  
30

GR 99 P 3132

- 4 -

Figure 2 a schematic representation of the use of the directory entries. After the creation of an object, it is entered at certain points in time in the directory as entry Oe1 for a first automation object. It can then be viewed by other users/tools. They can then use the name to request a reference to the object and work on or copy the latter directly.

Entering or changing or removing an object entry in the directory does not have to take place instantaneously. Here, too, the analogy with a telephone book again applies: even if individual entries become invalid, as a whole it can still be used. This property is important in particular in the case of distributed working, since the communication expenditure is minimized in this way. If an object is still in the directory, but no longer available, this is indicated when it is attempted to request a copy.

To sum up, the invention consequently relates to an automation system which has at least one automation object 1, with a directory V for storing object names O1..On of the automation objects, an object name O1..On being assigned a directory entry Oe1..Oen which has first information data O11 as a reference to the automation object, second information data O12 as a description of the technological functionality and third information data O13 as a description of interfaces of the automation object. This results in immediate and permanent access to currently created (partial) solutions, so that parallel and/or distributed working on automation objects is possible.

04-25-2001  
1999P03132 WO  
PCT/DE00/00737

PCT/DE00/00737

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- 5 -

## Patent claims

1. An automation system which has at least one automation object, with a directory (V) for storing object names (O1..On) of the automation objects, an object name (O1..On) being assigned a directory entry (OE1..Oen) which has first information data (O11) as a reference to the automation object, second information data (O12) as a description of the technological functionality and third information data (O13) as a description of interfaces of the automation object, it being possible, once entry into the directory (V) has taken place, for the automation object to be viewed by other users and/or tools and it being possible to use the object name (O1..On) of the automation object to request a reference to the automation object and the automation object to be worked on by a number of users in parallel.
2. The automation system as claimed in claim 1, characterized in that the directory entry (OE1) has fourth information data (O14) for listing the names of subcomponents of the automation object.
3. The automation system as claimed in either of claims 1 and 2, characterized in that the automation system has means for the automatic entry of an automation object into the directory (V).
4. The automation system as claimed in one of claims 1 to 3, characterized in that the automation system has means which indicate that an automation object is no longer available and that a copy of the object is being created.

GR 99 P 3132

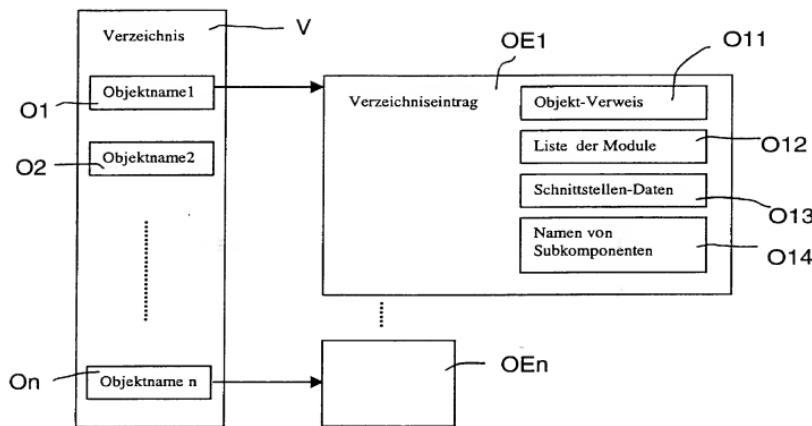
#### Abstract

Automation system with automation objects with a directory structure and method for the management of automation objects in a directory structure

The invention relates to an automation system which has at least one automation object (1), with a directory (V) for storing object names (O1..On) of the automation objects, an object name (O1..On) being assigned a directory entry (OE1..Oen) which has first information data (O11) as a reference to the automation object, second information data (O12) as a description of the technological functionality and third information data (O13) as a description of interfaces of the automation object. This results in immediate and permanent access to currently created (partial) solutions, so that parallel and/or distributed working on automation objects is possible.

Figure 1

09/936047

**Fig. 1**

09/936047

CHEMIEPOLYGRAPHISCHE AUSSTELLUNG

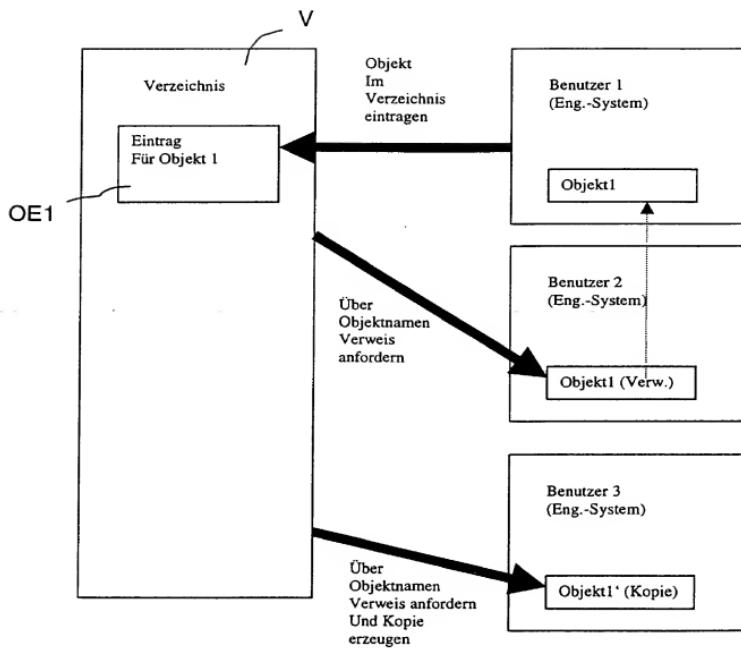


Fig. 2

# Declaration and Power of Attorney For Patent Application

## Erklärung Für Patentanmeldungen Mit Vollmacht

German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit  
an Eides Statt:

dass mein Wohnsitz, meine Postanschrift, und meine  
Staatsangehörigkeit den im Nachstehenden nach  
meinem Namen aufgeführten Angaben entsprechen,

dass ich, nach bestem Wissen der ursprüngliche, erste  
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Mitarbeiter (falls nachstehend mehrere Namen  
aufgeführt sind) des Gegenstandes bin, für den dieser  
Antrag gestellt wird und für den ein Patent beantragt  
wird für die Erfindung mit dem Titel:

Automatisierungssystem mit  
Automatisierungsobjekten mit  
Verzeichnisstruktur und Verfahren zur  
Verwaltung von  
Automatisierungsobjekten in einer  
Verzeichnisstruktur

deren Beschreibung

(zutreffendes ankreuzen)

hier beigelegt ist.

am 09.03.2000 als

PCT internationale Anmeldung

PCT Anmeldungsnummer PCT/DE00/00737

eingereicht wurde und am \_\_\_\_\_

abgeändert wurde (falls tatsächlich abgeändert).

Ich bestätige hiermit, dass ich den Inhalt der obigen  
Patentanmeldung einschließlich der Ansprüche  
durchgesehen und verstanden habe, die eventuell  
durch einen Zusatzantrag wie oben erwähnt abgeän-  
dert wurde.

Ich erkenne meine Pflicht zur Offenbarung irgendwel-  
cher Informationen, die für die Prüfung der vorliegen-  
den Anmeldung in Einklang mit Absatz 37, Bundes-  
gesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind,  
an.

Ich beanspruche hiermit ausländische Prioritätsvorteile  
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Vereinigten Staaten, Paragraph 119 aller unten ange-  
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anmeldungen für ein Patent oder eine Erfindersurkunde  
nachstehend gekennzeichnet, die ein Anmelde-  
datum haben, das vor dem Anmeldedatum der  
Anmeldung liegt, für die Priorität beansprucht wird.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are  
as stated below next to my name,

I believe I am the original, first and sole inventor (if only  
one name is listed below) or an original, first and joint  
inventor (if plural names are listed below) of the  
subject matter which is claimed and for which a patent  
is sought on the invention entitled

Automation system with automation  
objects with a directory structure and  
method for the management of  
automation objects in a directory system

the specification of which

(check one)

is attached hereto.

was filed on 09.03.2000 as

PCT international application

PCT Application No. PCT/DE00/00737

and was amended on \_\_\_\_\_

(if applicable)

I hereby state that I have reviewed and understand the  
contents of the above identified specification, including  
the claims as amended by any amendment referred to  
above.

I acknowledge the duty to disclose information which is  
material to the examination of this application in  
accordance with Title 35, Code of Federal Regulations,  
§1.56(a).

I hereby claim foreign priority benefits under Title 35,  
United States Code, §119 of any foreign application(s)  
for patent or inventor's certificate listed below and have  
also identified below any foreign application for patent  
or inventor's certificate having a filing date before that  
of the application on which priority is claimed:

## German Language Declaration

Prior foreign applications  
Priorität beansprucht

Priority Claimed

<u>19910537.5</u>	<u>DE</u>	<u>09.03.1999</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(Number)	(Country)	(Day Month Year Filed)	Yes	No
(Nummer)	(Land)	(Tag Monat Jahr eingereicht)	Ja	Nein
<u> </u>	<u> </u>	<u> </u>	<input type="checkbox"/>	<input type="checkbox"/>
(Number)	(Country)	(Day Month Year Filed)	Yes	No
(Nummer)	(Land)	(Tag Monat Jahr eingereicht)	Ja	Nein
<u> </u>	<u> </u>	<u> </u>	<input type="checkbox"/>	<input type="checkbox"/>
(Number)	(Country)	(Day Month Year Filed)	Yes	No
(Nummer)	(Land)	(Tag Monat Jahr eingereicht)	Ja	Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozeßordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozeßordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmelde datum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmelde datum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

<u>PCT/DE00/00737</u>	<u>09.03.2000</u>	<u>pending</u>
(Application Serial No.)	(Filing Date D, M, Y) (Anmelde datum T, M, J)	(Status) (patentiert, anhängig, aufgegeben)
<u> </u>	<u> </u>	<u> </u>
(Application Serial No.)	(Filing Date D,M,Y) (Anmelde datum T, M, J)	(Status) (patentiert, anhängig, aufgegeben)

Ich erkläre hiermit, dass alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und dass ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, dass wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozeßordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden können, und dass derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

**German Language Declaration**

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**POWER OF ATTORNEY:** As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (*list name and registration number*)

And I hereby appoint

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<b>DEUTSCHLAND</b>	<b>GERMANY</b>	

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(Supply similar information and signature for third and subsequent joint inventors).

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(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).

(Supply similar information and signature for third and subsequent joint inventors).

Voller Name des ersten Miterfinders <b>WALTER MÖLLER-NEHRING</b>	Full name of eleventh joint inventor <b>WALTER MÖLLER-NEHRING.</b>		
Unterschrift des Erfinders <i>Walter Möller-W.N.</i>	Datum 11 - 00	Inventor's signature <i>Walter Möller-W.N.</i>	Date 10.8.01
Wohnsitz <b>ERLANGEN, DEUTSCHLAND</b>	Residence <b>ERLANGEN, GERMANY DEX</b>		
Staatsangehörigkeit <b>DEUTSCH</b>	Citizenship <b>GERMAN</b>		
Postanschrift <b>AM DUMMETSWEIHER 90</b> <b>91056 ERLANGEN</b> <b>DEUTSCHLAND</b>	Post Office Address <b>AM DUMMETSWEIHER 90</b> <b>91056 ERLANGEN</b> <b>GERMANY</b>		
Voller Name des zwölften Miterfinders (falls zutreffend) <b>JÜRGEN SCHMOLL</b>	Full name of twelfth joint inventor, if any <b>JÜRGEN SCHMOLL</b>		
Unterschrift des Erfinders <i>Jürgen Schmoll</i>	Datum 12 - 00	Inventor's signature <i>Jürgen Schmoll</i>	Date 22.8.01
Wohnsitz <b>MARKT BEROLZHEIM, DEUTSCHLAND</b>	Residence <b>MARKT BEROLZHEIM, GERMANY DEX</b>		
Staatsangehörigkeit <b>DEUTSCH</b>	Citizenship <b>GERMAN</b>		
Postanschrift <b>BEIM GEISBAUM 10</b> <b>91801 MARKT BEROLZHEIM</b> <b>DEUTSCHLAND</b>	Post Office Address <b>BEIM GEISBAUM 10</b> <b>91801 MARKT BEROLZHEIM</b> <b>GERMANY</b>		
Voller Name des dreizehnten Miterfinders (falls zutreffend) <b>KARSTEN SCHNEIDER</b>	Full name of thirteenth joint inventor, if any <b>KARSTEN SCHNEIDER</b>		
Unterschrift des Erfinders <i>Karsten Schneider</i>	Datum 13 - 00	Inventor's signature <i>Karsten Schneider</i>	Date
Wohnsitz <b>ERLANGEN, DEUTSCHLAND</b>	Residence <b>ERLANGEN, GERMANY DEX</b>		
Staatsangehörigkeit <b>DEUTSCH</b>	Citizenship <b>GERMAN</b>		
Postanschrift <b>BOHLENPLATZ 7</b> <b>91054 ERLANGEN</b> <b>DEUTSCHLAND</b>	Post Office Address <b>BOHLENPLATZ 7</b> <b>91054 ERLANGEN</b> <b>GERMANY</b>		
Voller Name des vierzehnten Miterfinders (falls zutreffend) <b>ULRICH WELZ</b>	Full name of fourteenth joint inventor, if any <b>ULRICH WELZ</b>		
Unterschrift des Erfinders <i>Ulrich Welz</i>	Datum 14 - 00	Inventor's signature <i>Ulrich Welz</i>	Date 11.10.01
Wohnsitz <b>HERZOGENAURACH, DEUTSCHLAND</b>	Residence <b>HERZOGENAURACH, GERMANY DEX</b>		
Staatsangehörigkeit <b>DEUTSCH</b>	Citizenship <b>GERMAN</b>		
Postanschrift <b>AM HASENGARTEN 9</b> <b>91074 HERZOGENAURACH</b> <b>DEUTSCHLAND</b>	Post Office Address <b>AM HASENGARTEN 9</b> <b>91074 HERZOGENAURACH</b> <b>GERMANY</b>		

(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben). (Supply similar information and signature for third and subsequent joint inventors).



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## IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicants: Norbert BECKER et al.

-Int'l Application No.: PCT/DE00/00737

Application No.: 09/936,047

Filed: September 7, 2001

For: AUTOMATION SYSTEM WITH AUTOMATION OBJECTS WITH  
A DIRECTORY STRUCTURE AND METHOD FOR THE  
MANAGEMENT OF AUTOMATION OBJECTS IN A DIRECTORY  
STRUCTURE

**CHANGE OF ADDRESS AND REVOCATION AND  
SUBSTITUTION OF POWER OF ATTORNEY**

Hon. Commissioner of Patents and Trademarks  
Washington, D.C. 20231

January 2, 2002

Sir:

Under 37 C.F.R. § 3.73(b), the undersigned hereby states that the below-named Assignee is an assignee in the above-identified Application:

Assignee: **SIEMENS AKTIENGESELLSCHAFT**

The documentary evidence of a chain of title from the original owner to the Assignee is provided in the Assignment Document(s):

filed herewith,

previously filed,

Reel No. \_\_\_\_, Frame No. \_\_\_\_.

I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements, and the like so made, are punishable by fine or imprisonment, or both, under Section 1001, Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

**POWER OF ATTORNEY**

The Declaration submitted along with this application includes a Power of Attorney listing the attorneys of Birch, Stewart, Kolasch & Birch, LLP. Please hereby revoke the aforementioned attorneys and substitute the attorneys of Customer No. 30596, including the following attorneys of Harness, Dickey & Pierce, P.L.C., to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

Terry L. Clark	Registration No. 32,644
Donald J. Daley	Registration No. 34,313
John A. Castellano	Registration No. 35,094
Gary D. Yacura	Registration No. 35,416
Thomas S. Auchterlonie	Registration No. 37,275
Timothy R. Wyckoff	Registration No. 46,175

**CORRESPONDENCE ADDRESS**

I request the Patent and Trademark Office to direct all correspondence and telephone calls relative to this application to Customer No. 30596, Harness, Dickey & Pierce, P.L.C., P.O. Box 8910, Reston, Virginia 20195, (703) 390-3030.

The undersigned is empowered with full Power of Attorney on behalf of the assignee.

Respectfully submitted,

HARNESS, DICKEY & PIERCE, P.L.C.

By: \_\_\_\_\_

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